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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/782,097	02/19/2004	Masaaki Noda	MAT-8510US	4751

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EXAMINER	
GUZMAN, APRIL S	

ART UNIT	PAPER NUMBER
2618	

DATE MAILED: 10/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/782,097	NODA ET AL.	
	Examiner	Art Unit	
	April S. Guzman	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 February 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *02/19/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement submitted on February 19, 2004 has been considered by the Examiner and made of record in the application file.

Preliminary Amendment

3. The present Office Action is based upon the original patent application filed on February 19, 2004 as modified by the preliminary amendment filed also on February 19, 2004. **Claims 1-14** are now pending in the present application.

Drawings

4. Figures 4, 5, and 6 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the

applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

5. The drawings are objected to because the blocks with reference characters 4 in Figure 1 and reference character 44 in Figures 4 and 5 are labeled "Rower AMP" which is misspelled. Blocks 4 and 44 should be relabeled with --Power AMP--. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

6. The disclosure is objected to because of the following informalities:

a) On **page 1 line 5**, replace "s" with --a-- after "receiving".

b) On **page 4 line 3**, replace "61A" with - - 61 - - after "modulator".

c) On **page 6 line 22**, delete "2" after "embodiment".

d) On **page 7 line 2**, replace "8a" with --8b-- after "port" to be in accord with Figure 1 of them drawings.

e) On **page 7 line 5**, replace "8b" with --8a-- after "port" to be in accord with Figure 1 of the drawings.

f) On **page 8 line 27**, replace "21a" with --21-- after "port" to be in accord with Figure 2 of the drawings.

g) On **page 9 line 10**, replace "brabch" with --branch-- after "Another".

h) On **page 12 line 20**, replace "5" with --23-- after "divider" to be in accord with Figure 2 of the drawings.

Appropriate correction is required.

Claim Objections

7. **Claim 12** is objected to because of the following informalities:

a) On page 7 of 12 of the preliminary amendment to the claims, on line 3 the term "the variable frequency oscillator" lacks antecedent basis.

b) On page 7 of 12 of the preliminary amendment to the claims, on line 13 replace "arrange" with --arranged-- after "terminal" and replace "conned" with --connected-- after "be".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

9. **Claims 1-2** are rejected under 35 U.S.C. 102(a) as being anticipated by **Applicant's admission of prior art**.

Consider **claim 1**, Applicant's admission of prior art shows and discloses a digital signal transceiver (conventional digital signal transceiver 103) (Figure 5, and page 3 lines 5-6) comprising:

a frequency modulator (frequency modulator 61) for outputting a first high-frequency signal frequency-modulated with a digital signal input thereto in a transmitting mode (frequency modulator 61 receives a digital signal through the modulation input port 61b, modulates a high-frequency signal with the digital signal and outputs the frequency-modulated signal through the output port 61a) (page 4 lines 3-6), and for outputting a second high-frequency signal in a receiving mode (A high-frequency signal is transferred via the antenna switch 43 to the receiving filter 52 for allowing a desired

signal in the high-frequency signal to pass through the filter. The desired signal is amplified by the high-frequency amplifier 53. The amplified signal is mixed with an output signal of the frequency modulator 61 by the receiving mixer 54. A resultant intermediate frequency signal is then output from the output terminal 55) (Figure 5, page 3 lines 22-27, and page 4 lines 1-2), the second high-frequency signal being not modulated and containing a phase noise different in level from a phase noise in the first high-frequency signal (The signal 71 transferred from the antenna 41 and received by the receiving mixer 54 may contain a desired signal 71a and an interruption signal 71b which has a level larger than that of the signal 71a and has a frequency close to that of the desired signal 71a.) (Figure 5, Figure 6, and page 6 lines 6-9);

a power amplifier (power amplifier 44) for receiving a signal output from the frequency modulator (the signal output from the frequency modulator 61) (Figure 5, and page 3 lines 19-21);

an antenna terminal arranged to be connected to an antenna (antenna terminal 42 connected to an antenna 41) (Figure 5, and page 3 lines 6-7);

an antenna switch (antenna switch 43) comprising

a first branch port for receiving a signal output from the power amplifier (branch port 43b of the antenna switch 43 connected to output port of power amplifier 44 supplied by the signal output from the frequency modulator 61) (Figure 5, and page 3 lines 19-21),

a common port connected to the antenna terminal, said common port being connected to the first branch port in the transmitting mode (as seen in

Figure 5 the common port of the antenna switch 43 that is connected to the antenna terminal 42 wherein the power amplifier 44 of the transmitting mode has an output port connected to branch port 43b of the antenna switch 43) (see Figure 5, page 3 lines 6-9, and page 3 lines 20-21), and

a second branch port connected to the common port in the receiving mode (branch port 43a of the antenna switch 43 connected to a receiving filter 52 of the receiving mode) (Figure 5, and page 3 lines 8-9);

a filter having an input port thereof connected to the second branch port of the antenna switch (a receiving filter 52 connected to a branch port 43a of the antenna switch 43) (Figure 5, and page 3 lines 8-9);

a high-frequency amplifier having an input port thereof connected to an output port of the filter (a high frequency amplifier 53 connected to an output port of the receiving filter 52) (Figure 5, and page 3 lines 9-10); and

a mixer for mixing a signal output from the high-frequency amplifier with the signal output from the frequency modulator to output a signal including the signal from the high-frequency amplifier and the signal from the frequency modulator (a receiving mixer 54 having one import port connected to an output port of the high-frequency amplifier 53 and having another input port connected to an output port of a frequency modulator 61, and an output terminal 55 connected to an output port of the receiving mixer 54. The amplified signal is mixed with an output signal of the frequency modulator 61 by the receiving mixer 54. A resultant intermediate frequency signal is

then output from the output terminal 55) (Figure 5, page 3 lines 10-14, page 3 lines 26-27, and page 4 lines 1-2).

Consider **claim 2, as applied to claim 1 above**, Applicant's admission of prior art shows and discloses the phase noise in the second high-frequency signal has a level larger than a level of the phase noise in the first high-frequency signal (A desired signal 72a and interruption signal 72b wherein the desired signal 72a has a level smaller than that of the interruption signal 72b, the desired signal 72 may be disturbed by a phase noise 72c in the interruption signal 72b.) (Figure 6, and page 6 lines 11-16).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. **Claim 3-6, 8-10, 12, and 14 are** rejected under 35 U.S.C. 103(a) as being unpatentable over **Applicant's admission of prior art**, in view of **Clementi (U.S. Patent # 6,294,936)**.

Consider **claim 3, as applied to claim 1 above**, Applicant's admission of prior art shows and discloses a digital signal transceiver (conventional digital signal transceiver 103) (Figure 5, and page 3 lines 5-6) and a frequency modulator (frequency modulator 61) (Figure 5, and page 3 lines 5-21).

However, Applicant's admission of prior art fails to disclose the frequency modulator comprises a reference signal generating unit for generating a first reference signal, a variable-frequency oscillator for outputting a signal having a frequency varying according to a signal input thereto, a first frequency divider for frequency-dividing the signal output from the variable frequency oscillator, a phase comparator for comparing a signal output from the first frequency divider with the first reference signal in phase, and a low-pass filter having an input port thereof connected to an output port of the phase comparator, said low-pass filter outputting the signal input to the variable-frequency oscillator.

In the related art, Clementi shows and discloses

a reference signal generating unit for generating a first reference signal (read as a reference oscillator 22 which provides a stable oscillator frequency Fosc and a reference divider 24 which divides the oscillator frequency Fosc received at an input.) (Figure 2, Figure 4, Figure 6, column 2 lines 29-46, column 4 lines 48-62, column 5 lines 51-55),

a variable-frequency oscillator (voltage controlled oscillator (VCO) 36) for outputting a signal having a frequency varying according to a signal input thereto (Figure 2, Figure 4, Figure 6, column 2 lines 29-46, column 5 lines and column 5 lines 51-55),

a first frequency divider (feedback divider 26) for frequency-dividing the signal output from the variable frequency oscillator (Figure 2, Figure 4, Figure 6, column 2 lines 29-46, column 4 lines 56-62, and column 5 lines 51-55),

a phase comparator (phase detector/comparator 28) for comparing a signal output from the first frequency divider with the first reference signal in phase (Figure 2, Figure 4, Figure 6, column 2 lines 29-46, column 4 lines 63-67, column 5 lines 1-16, and column 5 lines 51-55), and

a low-pass filter (loop filter 32) having an input port thereof connected to an output port of the phase comparator, said low-pass filter outputting the signal input to the variable-frequency oscillator (Figure 2, Figure 4, Figure 6, column 5 lines 17-25, and column 5 lines 51-55).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the components of the frequency modulator taught by Clementi into the teachings of Noda et al. for the purpose of constructing a configuration that avoids the need for additional hardware which otherwise would increase the chip area and/or cost of the device.

Consider **claim 4, as applied to claim 3 above,** Applicant's admission of prior art further teaches that the signal 71 transferred from the antenna 41 and received by the receiving mixer 54 may contain a desired signal 71a and an interruption signal 71b which has a level larger than that of the signal 71a and has a frequency close to that of the desired signal 71a (Figure 5, Figure 6, and page 6 lines 6-9).

Consider **claim 5, as applied to claim 3 above**, and **claim 9, as applied to claim 8 above**, Applicant's admission of prior art shows and discloses a digital signal transceiver (conventional digital signal transceiver 103) (Figure 5, and page 3 lines 5-6) and a frequency modulator (frequency modulator 61) (Figure 5, and page 3 lines 5-21) wherein the frequency modulator comprises a reference signal generator (read as a reference oscillator 22 which provides a stable oscillator frequency Fosc and a reference divider 24 which divides the oscillator frequency Fosc received at an input.) (Figure 2, Figure 4, Figure 6, column 2 lines 29-46, column 4 lines 48-62, column 5 lines 51-55) and a frequency divider (feedback divider 26) (Figure 2, Figure 4, Figure 6, column 2 lines 29-46, column 4 lines 56-62, and column 5 lines 51-55).

However, Applicant's admission of prior art fails to disclose the reference-signal generating unit comprises a reference signal generator for generating a second

reference signal, and a second frequency divider for outputting the first reference signal by frequency-dividing the second signal by a first dividing rate in the receiving mode, and by frequency-dividing the high-frequency signal by a second dividing rate larger than the first dividing rate in the transmitting mode.

In the related art, Clementi shows and discloses the reference-signal generating unit comprises

a reference signal generator for generating a second reference signal (a reference oscillator 22 which provides a stable oscillator frequency Fosc) (Figure 2, Figure 4, Figure 6, column 2 lines 29-46, column 4 lines 48-62, column 5 lines 51-55), and

a second frequency divider for outputting the first reference signal by frequency-dividing the second signal by a first dividing rate in the receiving mode, and by frequency-dividing the high-frequency signal by a second dividing rate larger than the first dividing rate in the transmitting mode (A reference divider 24 which divides the oscillator frequency Fosc received at an input, and produces a divided reference frequency Fref at its output) (Figure 2, Figure 4, Figure 6, column 2 lines 29-46, column 4 lines 48-62, column 5 lines 51-55).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the teachings of Clementi into the teachings of the Applicant's admission to prior art for the purpose creating a signal generating unit to generate a stable oscillator frequency and divide the reference frequency at its output.

Consider **claim 6, as applied to claim 3 above**, and **claim 10, as applied to claim 8 above**, Applicant's admission of prior art shows and discloses a digital signal transceiver (conventional digital signal transceiver 103) (Figure 5, and page 3 lines 5-6) and a frequency modulator (frequency modulator 61) (Figure 5, and page 3 lines 5-21).

However, Applicant's admission to prior art fails to disclose the variable frequency oscillator comprises a voltage-controlled oscillator for outputting a signal having a frequency varying according to a voltage input thereto, and wherein the frequency modulator further comprises a charge pump for receiving the signal output from the phase comparator and for supplying a first current to the low-pass filter in the transmitting mode and a second current larger than the first current in the receiving mode to the low-pass filter according to the signal output from the phase comparator.

In the related art, Clementi shows and discloses

the variable frequency oscillator comprises a voltage-controlled oscillator for outputting a signal having a frequency varying according to a voltage input thereto (The output frequency Fvco of the VCO 36 is based on the control signal input to the VCO 36) (Figure 2, Figure 4, Figure 6, column 2 lines 29-46, column 5 lines 26-39, and column 5 lines 51-55), and

wherein the frequency modulator further comprises a charge pump for receiving the signal output from the phase comparator and for supplying a first current to the low-pass filter in the transmitting mode and a second current larger than the first current in the receiving mode to the low-pass filter according to the signal output from the phase comparator (Charge pump 30 has an input from the output from the phase comparator

28. The charge pump 30 increases or decreases a control voltage provided at its output based on whether the reference frequency Fref leads or lags the feedback signal.) (Figure 2, Figure 4, Figure 6, column 5 lines 17-25, and column 5 lines 51-55).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the teachings of Clementi into the teachings of the Applicant's admission to prior art for the purpose adjusting the frequency of operation by a small amount and to create either a higher or lower voltage power source.

Consider **claim 8 and claim 14**, Applicant's admission of prior art shows and discloses a digital signal transceiver (conventional digital signal transceiver 103) (Figure 5, and page 3 lines 5-6) comprising:

a frequency modulator (frequency modulator 61) for outputting a first high-frequency signal frequency-modulated with a digital signal input thereto in a transmitting mode (frequency modulator 61 receives a digital signal through the modulation input port 61b, modulates a high-frequency signal with the digital signal and outputs the frequency-modulated signal through the output port 61a) (page 4 lines 3-6), and for outputting a second high-frequency signal in a receiving mode (A high-frequency signal is transferred via the antenna switch 43 to the receiving filter 52 for allowing a desired signal in the high-frequency signal to pass through the filter. The desired signal is amplified by the high-frequency amplifier 53. The amplified signal is mixed with an output signal of the frequency modulator 61 by the receiving mixer 54. A resultant intermediate frequency signal is then output from the output terminal 55) (Figure 5, page

3 lines 22-27, and page 4 lines 1-2), the second high-frequency signal being not modulated and containing a phase noise different in level from a phase noise in the first high-frequency signal (The signal 71 transferred from the antenna 41 and received by the receiving mixer 54 may contain a desired signal 71a and an interruption signal 71b which has a level larger than that of the signal 71a and has a frequency close to that of the desired signal 71a.) (Figure 5, Figure 6, and page 6 lines 6-9);

a power amplifier (power amplifier 44) for receiving a signal output from the frequency modulator (the signal output from the frequency modulator 61) (Figure 5, and page 3 lines 19-21);

an antenna terminal arranged to be connected to an antenna (antenna terminal 42 connected to an antenna 41) (Figure 5, and page 3 lines 6-7);

an antenna switch (antenna switch 43) comprising

a first branch port for receiving a signal output from the power amplifier (branch port 43b of the antenna switch 43 connected to output port of power amplifier 44 supplied by the signal output from the frequency modulator 61) (Figure 5, and page 3 lines 19-21),

a common port connected to the antenna terminal, said common port being connected to the first branch port in the transmitting mode (as seen in Figure 5 the common port of the antenna switch 43 that is connected to the antenna terminal 42 wherein the power amplifier 44 of the transmitting mode has an output port connected to branch port 43b of the antenna switch 43) (see Figure 5, page 3 lines 6-9, and page 3 lines 20-21), and

a second branch port connected to the common port in the receiving mode (branch port 43a of the antenna switch 43 connected to a receiving filter 52 of the receiving mode) (Figure 5, and page 3 lines 8-9);

a filter having an input port thereof connected to the second branch port of the antenna switch (a receiving filter 52 connected to a branch port 43a of the antenna switch 43) (Figure 5, and page 3 lines 8-9);

a high-frequency amplifier having an input port thereof connected to an output port of the filter (a high frequency amplifier 53 connected to an output port of the receiving filter 52) (Figure 5, and page 3 lines 9-10); and

a mixer for mixing a signal output from the high-frequency amplifier with the signal output from the frequency modulator to output a signal including the signal from the high-frequency amplifier and the signal from the frequency modulator (a receiving mixer 54 having one import port connected to an output port of the high-frequency amplifier 53 and having another input port connected to an output port of a frequency modulator 61, and an output terminal 55 connected to an output port of the receiving mixer 54. The amplified signal is mixed with an output signal of the frequency modulator 61 by the receiving mixer 54. A resultant intermediate frequency signal is then output from the output terminal 55) (Figure 5, page 3 lines 10-14, page 3 lines 26-27, and page 4 lines 1-2).

However, Applicant's admission of prior art fails to show and disclose said frequency modulator comprising a reference signal generating unit for generating a first reference signal having a frequency in the transmitting mode lower than a frequency in

the receiving mode, a variable-frequency oscillator for outputting a signal having a frequency varying according to a signal input thereto, a first frequency divider for frequency-dividing the signal output from the variable frequency oscillator, a phase comparator for comparing a signal output from the first frequency divider with the first reference signal in phase, and a low-pass filter having an input port thereof connected to an output port of the phase comparator, said low-pass filter outputting the signal input to the variable-frequency oscillator.

In the related art, Clementi shows and discloses

a reference signal generating unit for generating a first reference signal (read as a reference oscillator 22 which provides a stable oscillator frequency Fosc and a reference divider 24 which divides the oscillator frequency Fosc received at an input.) (Figure 2, Figure 4, Figure 6, column 2 lines 29-46, column 4 lines 48-62, column 5 lines 51-55),

a variable-frequency oscillator (voltage controlled oscillator (VCO) 36) for outputting a signal having a frequency varying according to a signal input thereto (Figure 2, Figure 4, Figure 6, column 2 lines 29-46, column 5 lines and column 5 lines 51-55),

a first frequency divider (feedback divider 26) for frequency-dividing the signal output from the variable frequency oscillator (Figure 2, Figure 4, Figure 6, column 2 lines 29-46, column 4 lines 56-62, and column 5 lines 51-55),

a phase comparator (phase detector/comparator 28) for comparing a signal output from the first frequency divider with the first reference signal in phase (Figure 2,

Figure 4, Figure 6, column 2 lines 29-46, column 4 lines 63-67, column 5 lines 1-16, and column 5 lines 51-55), and

a low-pass filter (loop filter 32) having an input port thereof connected to an output port of the phase comparator, said low-pass filter outputting the signal input to the variable-frequency oscillator (Figure 2, Figure 4, Figure 6, column 5 lines 17-25, and column 5 lines 51-55).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the components of the frequency modulator taught by Clementi into the teachings of Noda et al. for the purpose of constructing a configuration that avoids the need for additional hardware which otherwise would increase the chip area and/or cost of the device.

Consider **claim 12**, Applicant's admission of prior art shows and discloses a digital signal transceiver (conventional digital signal transceiver 103) (Figure 5, and page 3 lines 5-6) comprising:

a frequency modulator (frequency modulator 61) for outputting a first high-frequency signal frequency-modulated with a digital signal input thereto in a transmitting mode (frequency modulator 61 receives a digital signal through the modulation input port 61b, modulates a high-frequency signal with the digital signal and outputs the frequency-modulated signal through the output port 61a) (page 4 lines 3-6), and for outputting a second high-frequency signal in a receiving mode (A high-frequency signal is transferred via the antenna switch 43 to the receiving filter 52 for allowing a desired signal in the high-frequency signal to pass through the filter. The desired signal is

amplified by the high-frequency amplifier 53. The amplified signal is mixed with an output signal of the frequency modulator 61 by the receiving mixer 54. A resultant intermediate frequency signal is then output from the output terminal 55) (Figure 5, page 3 lines 22-27, and page 4 lines 1-2), the second high-frequency signal being not modulated and containing a phase noise different in level from a phase noise in the first high-frequency signal (The signal 71 transferred from the antenna 41 and received by the receiving mixer 54 may contain a desired signal 71a and an interruption signal 71b which has a level larger than that of the signal 71a and has a frequency close to that of the desired signal 71a.) (Figure 5, Figure 6, and page 6 lines 6-9);

a power amplifier (power amplifier 44) for receiving a signal output from the frequency modulator (the signal output from the frequency modulator 61) (Figure 5, and page 3 lines 19-21);

an antenna terminal arranged to be connected to an antenna (antenna terminal 42 connected to an antenna 41) (Figure 5, and page 3 lines 6-7);

an antenna switch (antenna switch 43) comprising

a first branch port for receiving a signal output from the power amplifier (branch port 43b of the antenna switch 43 connected to output port of power amplifier 44 supplied by the signal output from the frequency modulator 61) (Figure 5, and page 3 lines 19-21),

a common port connected to the antenna terminal, said common port being connected to the first branch port in the transmitting mode (as seen in Figure 5 the common port of the antenna switch 43 that is connected to the

antenna terminal 42 wherein the power amplifier 44 of the transmitting mode has an output port connected to branch port 43b of the antenna switch 43) (see Figure 5, page 3 lines 6-9, and page 3 lines 20-21), and

a second branch port connected to the common port in the receiving mode (branch port 43a of the antenna switch 43 connected to a receiving filter 52 of the receiving mode) (Figure 5, and page 3 lines 8-9);

a filter having an input port thereof connected to the second branch port of the antenna switch (a receiving filter 52 connected to a branch port 43a of the antenna switch 43) (Figure 5, and page 3 lines 8-9);

a high-frequency amplifier having an input port thereof connected to an output port of the filter (a high frequency amplifier 53 connected to an output port of the receiving filter 52) (Figure 5, and page 3 lines 9-10); and

a mixer for mixing a signal output from the high-frequency amplifier with the signal output from the frequency modulator to output a signal including the signal from the high-frequency amplifier and the signal from the frequency modulator (a receiving mixer 54 having one import port connected to an output port of the high-frequency amplifier 53 and having another input port connected to an output port of a frequency modulator 61, and an output terminal 55 connected to an output port of the receiving mixer 54. The amplified signal is mixed with an output signal of the frequency modulator 61 by the receiving mixer 54. A resultant intermediate frequency signal is then output from the output terminal 55) (Figure 5, page 3 lines 10-14, page 3 lines 26-27, and page 4 lines 1-2).

However, Applicant's admission of prior art fails to show and disclose a reference signal generating unit for generating a reference signal, a voltage-controlled oscillator for outputting a signal having a frequency varying according to a voltage input thereto, a frequency divider for frequency-dividing the signal output from the variable frequency oscillator, a phase comparator for comparing a signal output from the frequency divider with the reference signal in phase, a charge pump for receiving the signal output from the phase comparator and for outputting a first current in the transmitting mode and a second current in the receiving mode according to the signal output from the phase comparator, a low-pass filter receiving the first and second currents and outputting the signal input to the voltage-controlled oscillator.

In the related art, Clementi shows and discloses

a reference signal generating unit for generating a first reference signal (read as a reference oscillator 22 which provides a stable oscillator frequency Fosc and a reference divider 24 which divides the oscillator frequency Fosc received at an input.) (Figure 2, Figure 4, Figure 6, column 2 lines 29-46, column 4 lines 48-62, column 5 lines 51-55),

a voltage controlled oscillator (voltage controlled oscillator (VCO) 36) for outputting a signal having a frequency varying according to a signal input thereto (Figure 2, Figure 4, Figure 6, column 2 lines 29-46, column 5 lines and column 5 lines 51-55),

a frequency divider (feedback divider 26) for frequency-dividing the signal output from the voltage controlled oscillator (Figure 2, Figure 4, Figure 6, column 2 lines 29-46, column 4 lines 56-62, and column 5 lines 51-55),

a phase comparator (phase detector/comparator 28) for comparing a signal output from the first frequency divider with the first reference signal in phase (Figure 2, Figure 4, Figure 6, column 2 lines 29-46, column 4 lines 63-67, column 5 lines 1-16, and column 5 lines 51-55),

a charge pump for receiving the signal output from the phase comparator and for outputting a first current in the transmitting mode and a second current in the receiving mode according to the signal output from the phase comparator (Charge pump 30 has an input from the output from the phase comparator 28. The charge pump 30 increases or decreases a control voltage provided at its output based on whether the reference frequency Fref leads or lags the feedback signal.) (Figure 2, Figure 4, Figure 6, column 5 lines 17-25, and column 5 lines 51-55), and

a low-pass filter (loop filter 32) having an input port thereof connected to an output port of the phase comparator, said low-pass filter outputting the signal input to the variable-frequency oscillator (Figure 2, Figure 4, Figure 6, column 5 lines 17-25, and column 5 lines 51-55).

14. **Claims 7, 11, and 13** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Applicant's admission of prior art**, in view of **Clementi (U.S. Patent # 6,294,936)**, and further in view of **well known prior art (MPEP 2144.03)**.

Consider **7, as applied to claim 3 above; claim 11, as applied to claim 8 above; and claim 13, as applied to claim 12 above,** Applicant's admission to prior art as modified by Clementi shows and discloses a digital signal transceiver comprising a frequency modulator with a low pass filter.

However, Applicant's admission to prior art as modified by Clementi fails to disclose that the low-pass filter has a cut off frequency in the transmitting mode higher than a cut-off frequency in the receiving mode.

Nonetheless, the Examiner takes Official Notice of the fact that a cut off frequency in the transmitting mode is higher than a cut off frequency in the receiving mode of a low-pass filter in a transceiver is well known in the art.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate a cut off frequency in the transmitting mode higher than a cut off frequency in the receiving mode as known in the art in the low pass filter taught by Clementi for the purpose of incorporating a filter that passes low frequencies but attenuates frequencies higher than the cut off frequency.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Boesch et al. (U.S. Patent # 6,157,821)

Castiglione et al. (U.S. Patent # 7,079,616)

Chang (U.S. Patent # 6,606,005)

Cripps (U.S. Patent # 5,550,865)

Cripps (U.S. Patent # 5,493,583)

Cripps (U.S. Patent # 5,533,056)

Damgaard et al. (U.S. Patent # 6,526,265)

Dent (U.S. Patent # 6,091,303)

Fourtet et al. (U.S. Patent # 6,345,173)

Heck (U.S. Patent # 4,755,774)

Hirano et al. (U.S. Patent # 6,563,387)

Ichimaru (U.S. Patent # 6,639,475)

Kasahara et al. (U.S. Patent # 6,714,772)

Kasai (U.S. Patent # 5,428,824)

Khlat (U.S. Patent # 6,873,218)

Na (U.S. Patent # 6,825,813)

Nakatani et al. (U.S. Patent # 6,226,499)

Ozawa et al. (U.S. Patent # 7,043,202)

Soe et al. (U.S. Patent # 6,351,485)

Tolson (U.S. Patent # 6,374,086)

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17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to April S. Guzman whose telephone number is 571-270-1101. The examiner can normally be reached on Monday - Thursday, 8:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edan Orgad can be reached on 571-272-7884. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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A.S.G/asg

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